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Liu

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(54) **TELESCOPIC HANDWRITING PEN**

(76) Inventor: **Ya-Chiao Liu**, No. 6, Lane 286, Tatung Rd., Sec. 1, Shichi, Taipei Hsien (TW) 22145

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B43K 7/12 (2006.01)
G09G 5/00 (2006.01)

(52) **U.S. Cl.** **401/258**; 401/117; 401/99; 345/179; 16/427; 16/429

(58) **Field of Classification Search** 401/99, 401/117, 195, 131, 258, 259, 260, 251; 345/179; 16/427, 429
See application file for complete search history.

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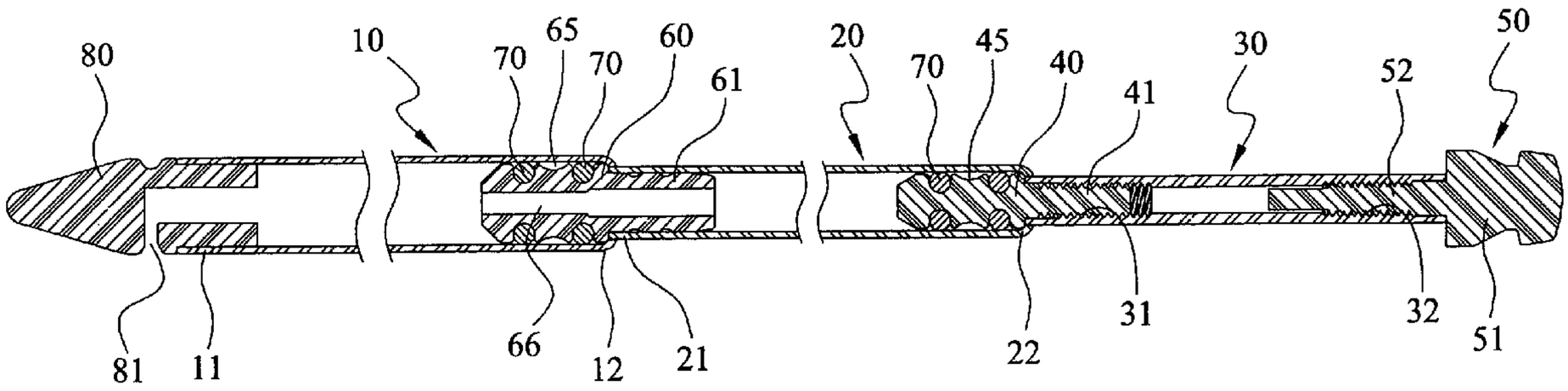
Primary Examiner—David J Walczak
(74) *Attorney, Agent, or Firm*—Bacon & Thomas, PLLC

(57) **ABSTRACT**

A telescopic handwriting pen for PDA or cellular phone. In one embodiment, the pen comprises tubelike inner, intermediate, and outer sections and first and second coupling assemblies fitted in front ends of the inner and intermediate sections. Either coupling assembly includes annular grooves with O-rings put thereon, an annular recess between the grooves filled with lubricating oil, and a rear extension secured to the inner or intermediate section. A writing head is fitted in a front end of the outer section and comprises a channel in fluid communication with the external and inside of the second coupling assembly. Stop mechanisms are provided in rear ends of the outer and intermediate sections for preventing an inside section from disengaging another section while sliding therein. The pen can carry out a smooth sliding and has a balanced weight.

7 Claims, 6 Drawing Sheets



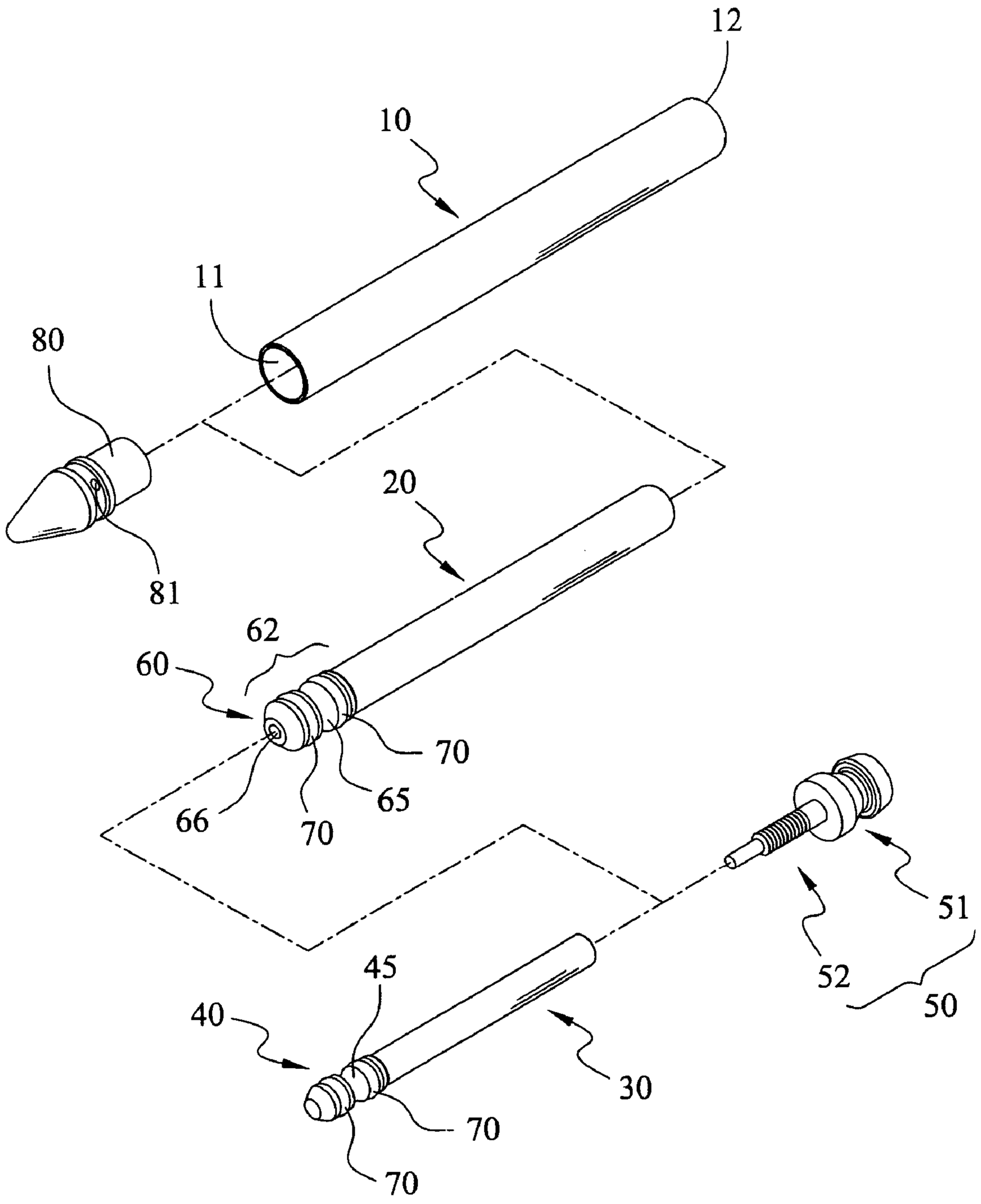


Fig. 1

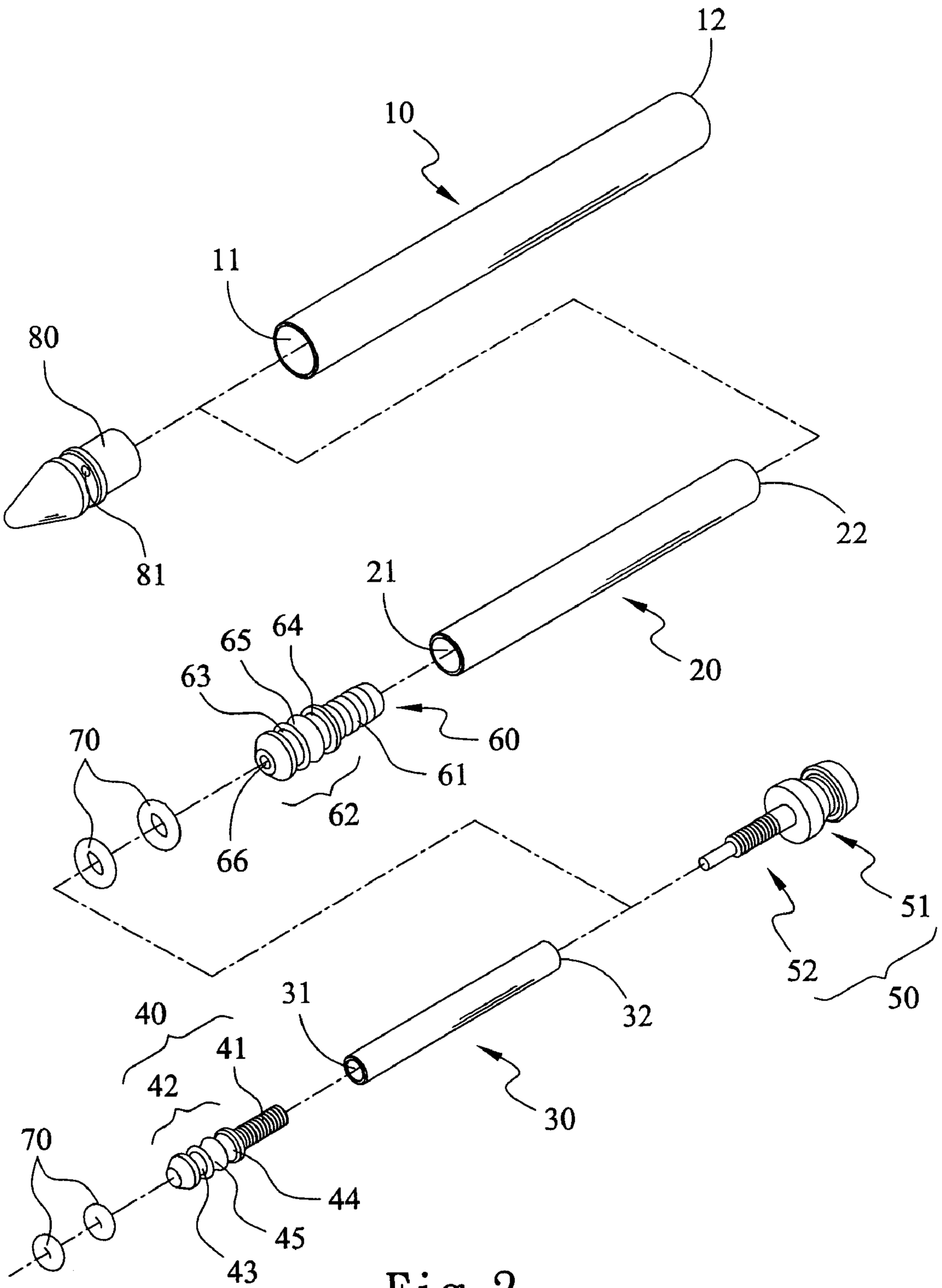

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Fig. 2

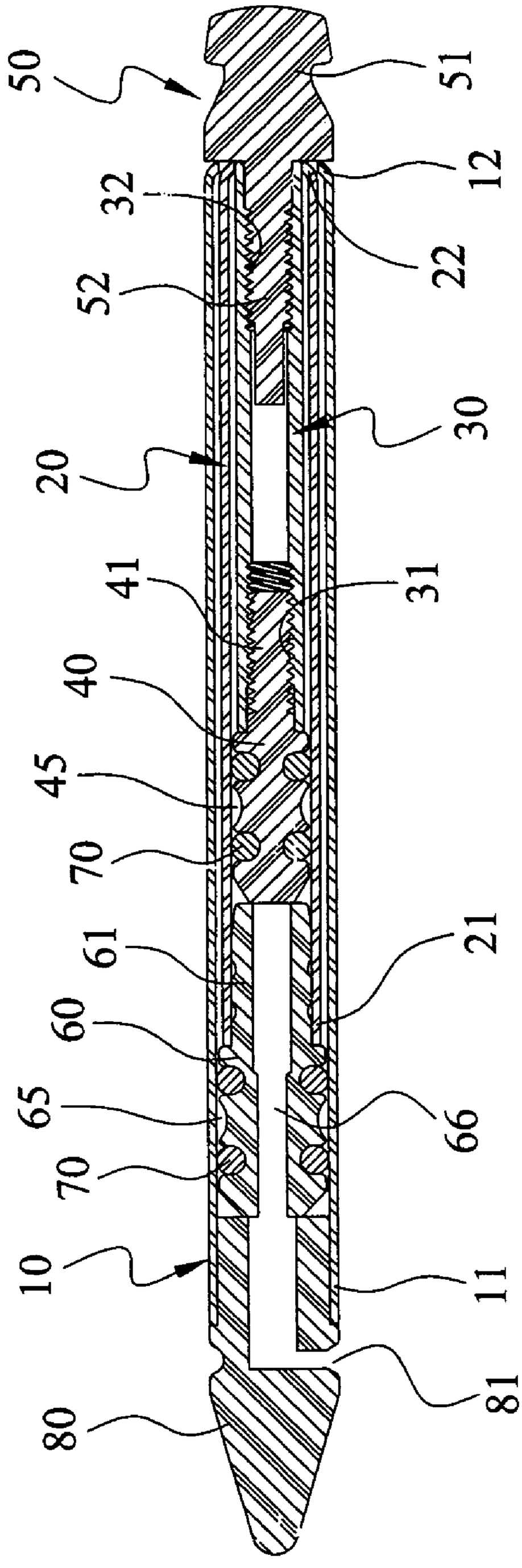

Fig. 3

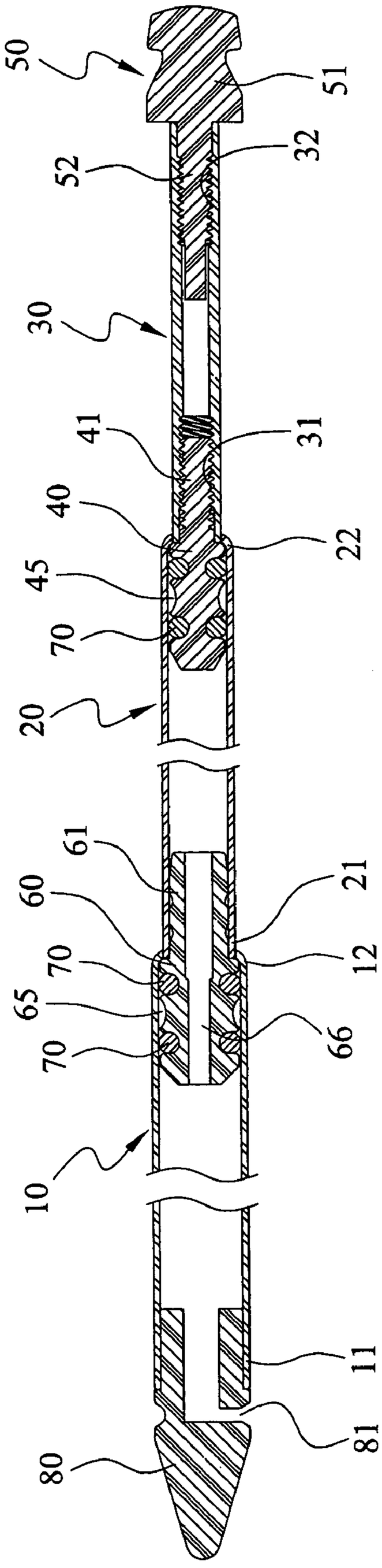

Fig. 4

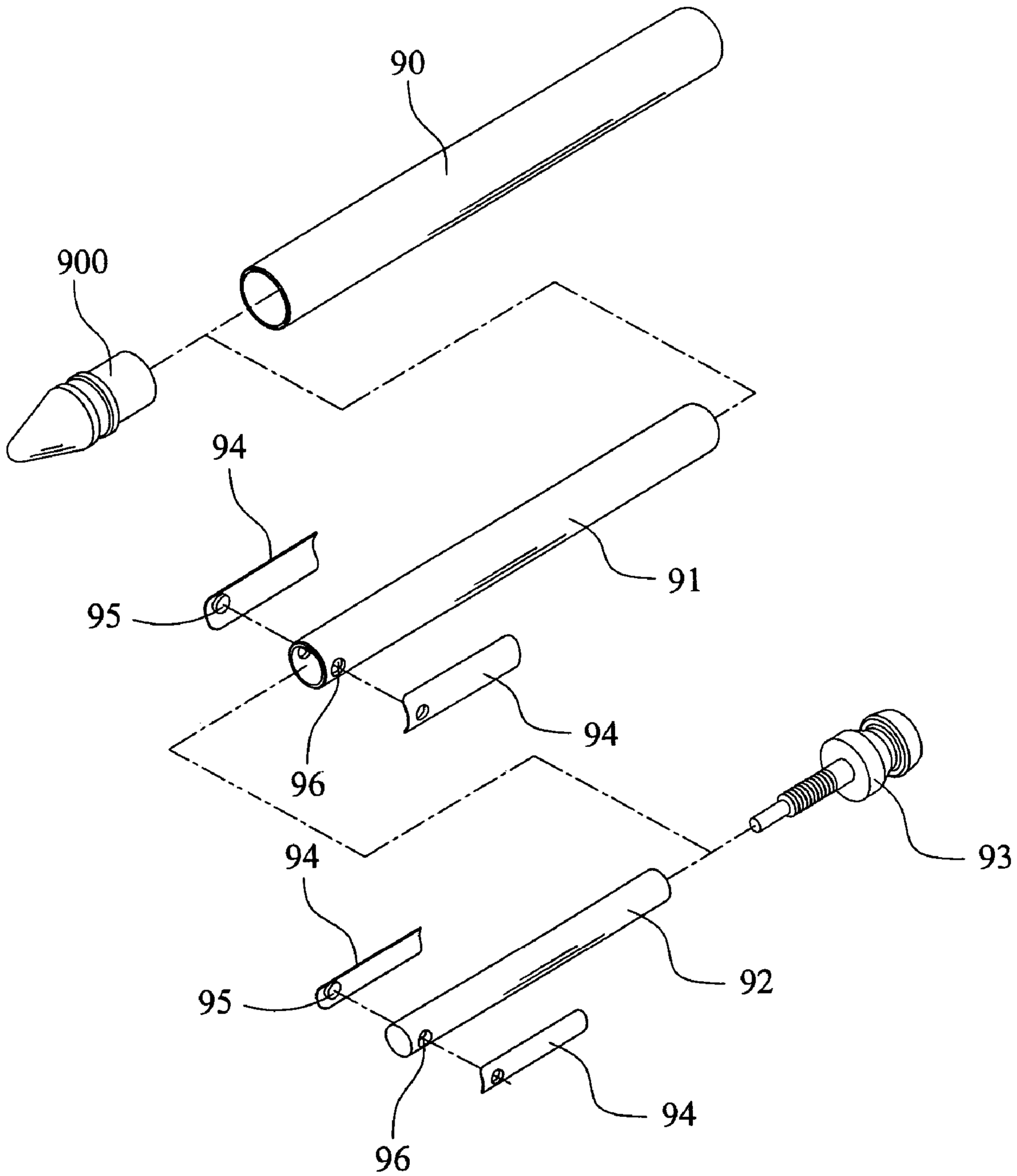

Fig. 5
PRIOR ART

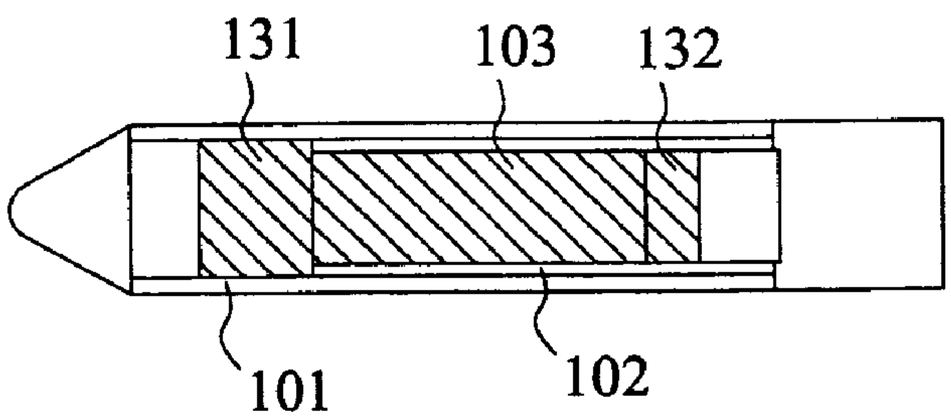

Fig. 6(a)

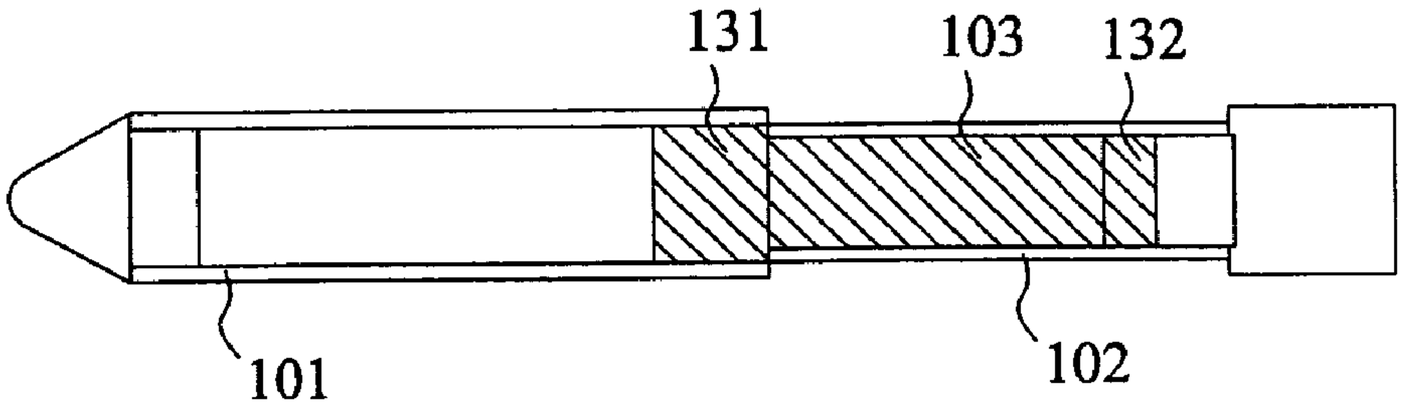

Fig. 6(b)

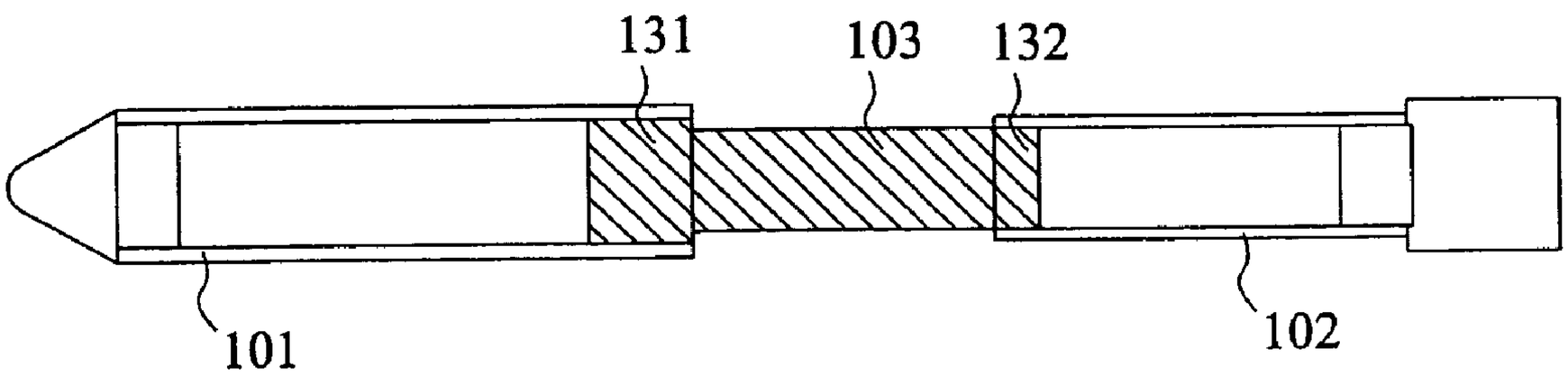

Fig. 6(c)

Fig. 6
PRIOR ART

TELESCOPIC HANDWRITING PEN

BACKGROUND OF THE INVENTION

1. Field of Invention

The present invention relates to telescopic handwriting pens for PDAs (personal digital assistants) or cellular phones and more particularly to such a telescopic handwriting pen with improved characteristics.

2. Related Art

A conventional telescopic handwriting pen is shown in FIG. **5** and comprises first, second, and third sections **90**, **91**, and **92** in the form of sleeve. The first section **90** comprises a separate forward writing head **900** and has a rear end connected to a front end of the second section **91**. A rear end of the second section **91** is connected to a front end of the third section **92**. A rear end of the third section **92** is fitted with a cap **93**. In use, pull the cap **93**, the second section **91**, and the third section **92** sequentially to form a pen. Two pairs of opposite, thin metal members **94** of arcuate section are provided between the first section **90** and the second section **91** and between the second section **91** and the third section **92** respectively. The section of each metal member **94** has an arc length less than half of periphery of the section **91** or **92** therebetween. The metal member **94** comprises a tab **95** on an inner surface. Correspondingly, two opposite holes **96** are formed on the front end of each of the second section **91** and the third section **92**. The tabs **95** are snugly fitted in the holes **96** for fastening the metal members **94**. Further, the metal members **94** provide a frictional contact either between the first and the second sections **90** and **91** or between the second and the third sections **91** and **92**. As a result, the first, second, and third sections **90**, **91**, and **92** are prevented from disengaging the pen while outward sliding.

But this is unsatisfactory for the purpose for which the invention is concerned for the following reasons: First, loud sounds are produced in sliding operation of the pen sections due to contact with the metal members **94**. Second, the sliding operation is not smooth due to no lubricating oil in the components of the pen. Third, the assembly is relatively difficult and time consuming. Particularly, fitting the tabs **95** in the holes **96** requires high precision with high manufacturing cost. Thus, it is not desirable in view of the competitive market.

Another conventional telescopic handwriting pen is shown in FIG. **6** and comprises an outer section **101** in the form of sleeve, an intermediate section **102** in the form of sleeve, and a solid, cylindrical inner section **103**. The inner section **103** comprises at its front end an enlarged first coupling member **131** adapted to slide within the outer section **101**, and at its rear end a second coupling member **132** adapted to slide within the intermediate section **102**. In a fully extended state of the pen, the first coupling member **131** is blocked in the rear end of the outer section **101** and the second coupling member **132** is blocked in a front end of the intermediate section **102**. To the contrary in a fully retracted state of the pen, the inner section **103** slides inside the intermediate section **102** and the intermediate section **102** slides inside the outer section **101** respectively.

But this is still unsatisfactory for the purpose for which the invention is concerned for the following reasons: First, the sliding operation is not smooth due to the solid inner section **103**. Second, weight of the extended pen is not balanced because the inner section **103** is solid. As a result, inconvenience can be caused in a handwriting operation. Thus, the need for improvement still exists.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a telescopic handwriting pen having advantages of being smooth in its sliding operation and balanced weight.

In one aspect of the present invention there is provided a telescopic handwriting pen comprising a tubelike inner section including at its both ends front and rear inner threads; a first coupling assembly including a rod-shaped member having first and second annular grooves two first O-rings put on the first and the second grooves, an annular recess between the first and the second grooves filled with lubricating oil, and an outer threaded extension projected from its rear end threadedly secured to the front inner threads of the inner section; a tubelike intermediate section including an inwardly extending rim at its rear end; a hollow cylindrical second coupling assembly including a rod-shaped member having third and fourth annular grooves two second O-rings put on the third and the fourth grooves, an annular recess between the third and the fourth grooves filled with lubricating oil, and an outer extension projected from its rear and lockingly fitted in a front end of the intermediate section; a cap including an outer threaded extension projected from its front end and threadedly secured to the rear inner threads of the inner section; a tubelike outer section including an inwardly extending rim at its rear end; and a writing head lockingly fitted in a front end of the outer section, whereby sliding the inner section rearward by holding the cap until a shoulder between the rear groove of the first coupling assembly and the threaded extension of the first coupling assembly is stopped by the inwardly extending rim of the intermediate section, and further sliding the inner section rearward until a shoulder between the rear groove of the second coupling assembly and the outer extension of the second coupling assembly is stopped by the inwardly extending rim of the outer section will fully extend the handwriting pen.

In another aspect of the present invention there is provided a telescopic handwriting pen comprising a tubelike inner section including at its both ends front and rear inner threads; a first coupling assembly including a rod-shaped member having first and second annular grooves two first O-rings put on the first and the second grooves, an annular recess between the first and the second grooves filled with lubricating oil, and an outer threaded extension projected from its rear end threadedly secured to the front inner threads of the inner section; a cap including an outer threaded extension projected from its front end and threadedly secured to the rear inner threads of the inner section; a tubelike outer section including an inwardly extending rim at its rear end; and a writing head lockingly fitted in a front end of the outer section, whereby sliding the inner section rearward by holding the cap until a shoulder between the rear groove of the first coupling assembly and the threaded extension of the first coupling assembly is stopped by the inwardly extending rim will fully extend the handwriting pen.

In yet another aspect of the present invention the writing head comprises a channel in fluid communication with the external and inside of the handwriting pen.

The above and other objects, features and advantages of the present invention will become apparent from the following detailed description taken with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an exploded view of a preferred embodiment of telescopic handwriting pen according to the invention;

FIG. **2** is another exploded view of the telescopic handwriting pen in great detail;

FIG. **3** is a sectional view of the assembled handwriting pen in its retracted state;

FIG. **4** is a view similar to FIG. **3** where the handwriting pen is fully extended;

FIG. **5** is an exploded view of a conventional telescopic handwriting pen; and

FIG. **6** is a sectional view of showing relative positioning of the components of another conventional telescopic handwriting pen in three phases (a), (b) and (c) of its extending operation.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIGS. **1**, **2** and **3**, a telescopic handwriting pen constructed in accordance with a preferred embodiment of the invention comprises an outer section **10**, an intermediate section **20**, and an inner section **30** all in the form of sleeve. The inner section **30** comprises at its both ends inner threads **31** and **32**. A rod-shaped first coupling assembly **40** is fitted in a front end of the inner section **30** and comprises a member **42** having two annular grooves **43** and **44** and an annular recess **45** between the grooves **43** and **44**, and an outer threaded extension **41** projected from its rear threadedly secured to the inner threads **31**. Two O-rings **70** are put on the grooves **43** and **44**. A hollow cylindrical second coupling assembly **60** is fitted in a front end **21** of the intermediate section **20** and comprises a member **62** having two annular grooves **63** and **64** and an annular recess **65** between the grooves **63** and **64**, an outer extension **61** of toothed lengthwise section projected from its rear and tightly fitted in the front end **21** of the intermediate section **20**, and a central bore **66**. Another two O-rings **70** are put on the grooves **63** and **64**. A cap **50** comprises an enlargement **51** and an outer threaded extension **52** projected from its front end and threadedly secured to the inner threads **32**. A writing head **80** is fitted in a front end of the outer section **10** and comprises a channel **81** in fluid communication with the external and the bore **66** through the writing head **80**. The provision of the channel **81** is for balancing internal and external pressures and thus smoothing a sliding operation of the pen sections.

Referring to FIG. **4**, a user may slide the inner section **30** rearward by holding the enlargement **51** until a shoulder between the rear groove **44** and the threaded extension **41** is stopped by an inwardly extending rim **22** at a rear end of the intermediate section **20**. At this position, the inner section **30** is fully extended. Next, further slide the inner section **30** rearward until a shoulder between the rear groove **64** and the outer extension **61** is stopped by an inwardly extending rim **12** at a rear end of the outer section **10**. At this position, both the intermediate section **20** and the pen are fully extended.

Lubricating oil is filled in the recesses **45** and **65**. Also, the O-rings **70** can prevent lubricating oil from leaking. Thus, a smooth sliding operation of the pen can be achieved and can last for a long period of time. Further, the O-rings **70** can balance the weight of the pen. In another embodiment, three sections are reduced to two sections. That is, the intermediate section is eliminated.

While the invention herein disclosed has been described by means of specific embodiments, numerous modifications and variations could be made thereto by those skilled in the art without departing from the scope and spirit of the invention set forth in the claims.

What is claimed is:

1. A telescopic handwriting pen comprising:

a tubelike inner section including at its both ends front and rear inner threads;

a first coupling assembly including a rod-shaped member having first and second annular grooves two first O-rings put on the first and the second grooves, an annular recess between the first and the second grooves filled with lubricating oil, and an outer threaded extension projected from its rear end threadedly secured to the front inner threads of the inner section;

a tubelike intermediate section including an inwardly extending rim at its rear end;

a hollow cylindrical second coupling assembly including a rod-shaped member having third and fourth annular grooves two second O-rings put on the third and the fourth grooves, an annular recess between the third and the fourth grooves filled with lubricating oil, and an outer extension projected from its rear and lockingly fitted in a front end of the intermediate section;

a cap including an outer threaded extension projected from its front end and threadedly secured to the rear inner threads of the inner section;

a tubelike outer section including an inwardly extending rim at its rear end; and

a writing head lockingly fitted in a front end of the outer section,

whereby sliding the inner section rearward by holding the cap until a shoulder between the rear groove of the first coupling assembly and the threaded extension of the first coupling assembly is stopped by the inwardly extending rim of the intermediate section, and further sliding the inner section rearward until a shoulder between the rear groove of the second coupling assembly and the outer extension of the second coupling assembly is stopped by the inwardly extending rim of the outer section will fully extend the handwriting pen.

2. The telescopic handwriting pen of claim **1**, wherein the outer extension of the second coupling assembly is of toothed lengthwise section.

3. The telescopic handwriting pen of claim **1**, wherein the cap is shaped as an enlargement.

4. The telescopic handwriting pen of claim **1**, wherein the writing head comprises a channel in fluid communication with the external and inside of the second coupling assembly.

5. A telescopic handwriting pen comprising:

a tubelike inner section including at its both ends front and rear inner threads;

a first coupling assembly including a rod-shaped member having first and second annular grooves two first O-rings put on the first and the second grooves, an annular recess between the first and the second grooves filled with lubricating oil, and an outer threaded extension projected from its rear end threadedly secured to the front inner threads of the inner section;

a cap including an outer threaded extension projected from its front end and threadedly secured to the rear inner threads of the inner section;

a tubelike outer section including an inwardly extending rim at its rear end; and

a writing head lockingly fitted in a front end of the outer section,

whereby sliding the inner section rearward by holding the cap until a shoulder between the rear groove of the first coupling assembly and the threaded extension of the first coupling assembly is stopped by the inwardly extending rim will fully extend the handwriting pen.

6. The telescopic handwriting pen of claim **5**, wherein the cap is shaped as an enlargement.

7. The telescopic handwriting pen of claim **5**, wherein the writing head comprises a channel in fluid communication with the external and inside of the first coupling assembly.

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